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ABSTRACT

Described and announced are the 1971-1972 Bureau of the Census training programs for foreign statisticians. Programs lasting 11 months are offered in these areas: (1) population statistics and demographic analysis, (2) sampling and survey methods, (3) agricultural surveys and censuses, (4) economic surveys and censuses, and (5) data processing. The objectives of the program are a) to train statisticians and technicians in the variety of skills needed to plan and carry out specified statistical activities, and b) to train these persons to assist others in developing similar skills. Each program includes classroom instruction, seminars, workshops, field demonstrations, and special projects. Specific program descriptions and a complete list of courses, laboratories and workshops are given. (Author/RS)

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STATISTICAL TRAINING PROGRAMS

by the U.S. Bureau of the Census

4 Copy 1971
SURPLUS DUPLICATE

Population Statistics and Demographic Analysis

Sampling and Survey Methods

Agricultural Surveys and Censuses

Economic Surveys and Censuses

Data Processing

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Conducted by the U.S. Bureau of the Census under a Participating Agency Service Agreement, for the Agency for International Development, U.S. Department of State

Sept. 1971 to Aug. 1972

U.S. Department of Commerce
Bureau of the Census
International Statistical Programs
Washington, D.C.

CALENDAR OF TRAINING ACTIVITIES

Date	Activity
August 26 and 27, 1971	Arrival of participants and orientation at AID
August 30 to September 3	Orientation at Washington International Center
or	or
September 7 to 10	Population Dynamics Seminar
September 13 and 14,	Orientation at the Bureau of the Census
September 15 to December 17	First Training Period (13 weeks)
October 26 to 29	Seminar: Role of Statistics in Development
December 20 to January 1, 1972	Mid-winter Community Seminar and recess
January 3 to March 15, 1972	Second Training Period (10 ½ weeks)
March 16 to 19	Recess
March 20 to May 26	Third Training Period (10 weeks)
May 27 to June 4	Special programs (to be arranged)
June 5 to July 28	Fourth Training Period (8 weeks) Atlantida Workshop in Household Sample Surveys and Field Demonstration Agriculture Sample Survey Workshop and Field Demonstration
June 5 to July 14	Seminar: Advanced Demographic Analysis (Spanish only)
July 30 to August 5	Communication Workshop in East Lansing, Michigan
August 7 to 9	Consultation, evaluation, exit interviews, and departure of participants.

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STATISTICAL TRAINING PROGRAMS

I. Introduction

The Bureau of the Census has conducted training programs for foreign statisticians for 25 years and has contributed substantially to statistical development in many countries. In order to serve the urgent needs for trained personnel who can collect, process, and analyze statistical data, the Bureau has expanded its training. Under the auspices of AID, an 11-month program is offered in each of the following specialized areas:

(1) Population Statistics and Demographic Analysis

(2) Sampling and Survey Methods

(3) Agricultural Surveys and Censuses (based on Joint FAO/US Agricultural Statistics Training Program)

(4) Economic Surveys and Censuses

(5) Data Processing

The program described in this booklet is conducted from September 1971 to August 1972. In content, it is revised somewhat from the program offered in past years in that the curriculum has been updated and expanded to include new and advanced topics and techniques to meet the current needs of countries.

II. Objectives and content of training

The program is designed to provide training for persons with responsibility for statistical operations and those engaged in research and analysis. The objectives of the program are (a) to train statisticians and technicians in the variety of skills needed to plan and carry out specified statistical activities and (b) to train these persons to assist others in developing similar skills, thus introducing an important multiplier effect at the national level. The Bureau of the Census has developed a variety of materials, not only in census and survey methods but in the production of other basic economic and social statistics and in electronic data processing. The curriculum provides for specific training in each of the five areas listed above, although some of the courses have broad interest and applicability and overlap several of the specialties.

The program consists of classroom instruction, seminars, workshops, field demonstrations, and special projects. The training is oriented toward surveys and censuses and related statistical operations. Academic credit for successful completion of specific courses is awarded by the Graduate School of the U. S. Department of Agriculture[1], with which the Bureau of the Census has a cooperative agreement.

A complete list of courses is given on pages 4 and 5. Specific program descriptions and courses of study for the five specialized areas are given on pages 6 to 16. Participants whose training objectives do not fall within the specialized fields may select elements from the five programs according to their needs.

III. Calendar of activities

A Calendar of Training Activities appears on the inside front cover of this booklet. It lists the major elements of the program and shows their scheduled dates. One week of general orientation to the United States at the Washington International Center precedes the technical training at the Bureau of the Census. (Note that it is scheduled so that a participant will attend the orientation before or after the seminar on Population Dynamics.) Similar arrangements are made for persons arriving at later dates for parts of the full program.

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[1] Although originally established for continued training of agricultural employees in the government, the Graduate School has expanded its curriculum and offers courses at both the graduate and undergraduate level in various disciplines--economics, mathematics, statistics, computer science, language, etc. Government agencies generally accept the credits of the Graduate School, for examination and qualification purposes, on the same basis as those from accredited colleges and universities.

A 1-week seminar on Population Dynamics also precedes the training at the Bureau of the Census. It provides an introduction to demographic, economic, and social interrelationships of importance to all statistical programs. The seminar in Washington is conducted for AID by the Governmental Affairs Institute.

The year's program is divided into four training periods. The first three consist primarily of classroom and laboratory work; this type of training gives participants basic training in the professional knowledge and skills needed for carrying out statistical operations and analyses. Also, it prepares them for full participation in the case-study workshops and field demonstrations which constitute the major elements of training during the fourth period.

Participation in all or part of the full program is possible in accordance with the training calendar and qualification requirements. Those persons who wish to enroll in the second training period, for example, should have prior education or experience equivalent to the basic courses offered during the first training period.

It is expected that all persons who undergo the classroom training normally will participate in workshops offered in their specialized field. Separate enrollment for each workshop also is available for experienced statistical technicians who do not participate in the earlier part of the training.

A 1-week Communication Workshop is a basic element of all AID-sponsored training programs for foreign participants. The Bureau of the Census recommends that participants sponsored by agencies other than AID also attend this program. The Communication Workshop is conducted throughout the year by Michigan State University, in Michigan during the summer and in Ohio during the remainder of the year. Participants are usually scheduled for this workshop near the close of their training program.

During the last 2 weeks of December 1971, mid-winter community seminars are planned for several locations away from Washington, D. C. These seminars are conducted by voluntary organizations working in cooperation with AID.

IV. Program duration and costs

The training program lasts approximately 11 months, although there may be some exceptions for participants in data processing and economic statistics (see also discussion of individual programs on pages 6 to 16). The 11-month period includes time for orientation and the special leadership and communication programs. The cost for the full program, exclusive of international travel, is estimated at $7,500 for each participant.

Persons enrolling separately for either of the agriculture or household survey case-study workshops during the fourth training period should anticipate spending about 12 weeks in the United States, allowing for orientation, communication workshop, and related travel in addition to the statistical workshop sessions. The estimated cost of participating only in one of the Census Bureau's workshops is $2,000, exclusive of international travel.

Training program costs consist primarily of subsistence, which for AID participants is calculated at the rate of $13 per day while in Washington, D. C., and $23 a day while in travel status within the United States.

V. Qualifications of participants

Technical training programs of the Bureau of the Census are conducted primarily for statisticians and technicians who have had some working experience (at least a year) in national statistical programs. Formal educational background may range from high school graduation to advanced university degrees. Academic training in mathematics, statistics, and economics is especially desirable.

A minimum English language score of 70/70 (ALIGU) is required, although a higher level is needed to obtain major benefits from the program. AID missions and other sponsoring agencies are urged to provide potential participants with the necessary training to attain maximum pro-

ficiency in English prior to their arrival in the United States. Sponsors that wish to send participants to the United States to receive training in English prior to their undertaking the technical training should provide time and funds for this purpose.

In addition to the above qualification conditions, all candidates for enrollment in the training program must fulfill the requirements of their sponsoring agencies.

VI. Action to be taken by sponsoring agency

It is desirable that nominations of qualified participants be made sufficiently early to permit adequate time for processing their applications and arranging for their programs. It is suggested that nominations be submitted through appropriate channels at least 2 to 3 months prior to the starting date of the program, and biographical data 1 to 2 months prior to the opening date.

VII. Other considerations

Participants are requested to bring with them questionnaires, instructions, descriptions of procedures, publications, and other materials pertinent to the national statistical program in which they may be engaged. These materials will be of practical value to the participants throughout their training. Also, it is strongly recommended that the objectives and content of the proposed training be discussed in detail by the candidate, his supervisor, and a representative of the sponsoring agency prior to departure from the home country, with the aim of relating training objectives to future job responsibilities.

VIII. Academic programs

At the request of sponsoring agencies, the Census Bureau will place qualified statisticians in American universities to study statistics or related fields. Continuous contact will be maintained with these students, and arrangements may be made to provide them with practical experience in appropriate workshop programs during their academic vacations. These programs are designed to meet special needs of statistical offices and other organizations in developing countries for university-trained statisticians.

The Census Bureau also encourages participants in its technical training and workshop programs to enroll in evening classes in universities in the Washington area. Participants will be assisted in selecting courses in conformance with their countries' objectives. Credit for these courses is given only if suitable academic records are furnished in advance of registration and proof of proficiency in the English language is submitted in the form of a passing score on TOEFL, the Michigan State, or ALIGU tests.

CURRICULUM OF COURSES BY SUBJECT AREA

Course number	Subject area and title	Training period
	Population Statistics and Demography	
301	Population and Housing Census Methods	1
302	Laboratory Sessions on Life Table Construction	1
303	World Population Trends and Problems	2
304	Introduction to Population Analysis	1
305	Advanced Techniques of Population Analysis	2
306	Population Projections	2
307	Introduction to Mathematics of Demography	3
308	Demographic Measures from Incomplete Data	3
311	Population and Family Planning	3
350	Special Projects in Population	2 and 3
375	Seminar: Advanced Demographic Analysis (Spanish only)	4
390	New Florencia: A Case Study for the 1970 Censuses of Population and Housing	2
	Principles of Statistics and Sampling	
101	Basic Statistical Concepts and Methods of Analysis	1
102	*Principles of Sample Surveys	1 or 2
103	Applications of Sample Design	3
115	Advanced Sampling Seminar	2
122	Introduction to the Control and Evaluation of Nonsampling Errors	3
150	Special Projects in Sampling and Survey Methods	2 and 3
190	Atlantida: A Case Study in Household Sample Surveys	4
	Agricultural Survey Methods	
201	Current Agricultural Survey Methods	1 and 2
202	Objective Measurement of Yield and Area	2 and 3
203	Demonstration Sample Survey Laboratory	2
250	Special Projects in Agricultural Statistics	2 and 3
290	Agriculture Sample Survey Workshop and Field Demonstration	4
	Economic Statistics	
401	Basic Economic Statistical Concepts and Operations	1
402	Principles of Economics: An Introductory Analysis	1 and 2
403	Introduction to Mathematics for Economic Analysis	2 and 3
420	Study of Selected U.S. Economic Statistics Programs	3
450	Special Projects in Economic Statistics	2 and 3
490	Providencia: A Case Study in Economic Censuses	2

*For participants with statistical background equivalent to course 101; same course offered in both training periods.

Course number	Subject area and title	Training period
	Data Processing	
501	*Subject-matter Planning for Data Processing	1 or 3
511	Computing Systems Fundamentals	1
512	Fundamentals of Programming	1
513	COBOL Programming and Testing	1
514	*IBM S/360 Introduction	1 or 2
515	*RPG Coding for Computers	1 or 2
521	IBM S/360 Assembler Language Coding	2
522	Job Control Card and Utility Programs	2
523	*Disk/Tape Operating Systems	2 or 3
524	Systems Analysis (Project Planning)	2
531	Disk/Tape Data Management Coding	3
532	FORTRAN IV Coding	3
533	PL/1 Coding	3
534	Systems Analysis Workshop	3
550	Special Projects in Systems Planning	4
590	CENTS: Census Tabulation System	2 and 3
	Statistical Technology	
600	Seminar: Role of Statistics in Development	1
601	Geography and Mapping for Surveys and Censuses	1
602	Survey Questionnaires and Forms: Design	1
603	Survey Questionnaires and Forms: Response Research	2
604	Publication of Statistical Data	3
605	Analytical Approach to Training	3
650	Special Projects in Statistical Technology	2 and 3

*Same course offered in two training periods.

POPULATION

POPULATION STATISTICS AND DEMOGRAPHIC ANALYSIS

Training objectives

Censuses and demographic surveys provide the principal basis for establishing dependable data on the numbers, geographic distribution, and characteristics of the population; also they are frequently the principal statistical vehicles for measurement of population change. The data can serve as a basis for determining national population policies and for measuring the impact of family planning programs in addition to the familiar uses in planning and administering programs of economic and social development. For censuses and surveys to produce the results that are needed and for them to be interpreted properly, the responsible national organizations must have an adequate number of well-trained personnel.

More than 100 developing countries have been or will be participating in the 1970 World Censuses of Population. It is of vital importance that the censuses produce timely results that satisfy basic demographic inventory needs. Training in census concepts and methods is incorporated in the 1971-1972 program for participants requiring such training; however, with many countries already past the data-collection stage, emphasis is placed on the processing and analysis of data and on household sample surveys as a continuing source of demographic and related information. The training is intended primarily for professional personnel working in population and housing censuses, household surveys, and programs of demographic analysis and projection. The training prepares them for major roles in planning and conducting surveys and censuses. It also prepares them to evaluate, adjust, and project demographic data from all sources. Important portions of the training deal with advanced demographic techniques and with the adjustment and use of incomplete and defective data.

Duration

The entire program lasts 11 months. Most participants are expected to enroll for the full program. Separate enrollment is possible, however, for the Atlantida Workshop or for other complete elements of the program in accordance with participant qualifications and training objectives. Participants may join the program at the beginning of a training period if they have prior education or experience equivalent to the training offered during the preceding period(s).

Training plan

The 11-month program is divided into four training periods, as shown in the Calendar of Training Activities on the inside front cover of this booklet. In the first three, participants are primarily involved in classroom courses and seminars; in the fourth, they spend full time in the Atlantida Workshop. The classroom work in the first three training periods gives participants basic training in the professional knowledge and skills needed for obtaining and analyzing demographic data. Demography is the major area of training emphasis, but closely related auxiliary fields and skills are included; such as statistical sampling, survey methods, census geography, data processing, and design of questionnaires and related forms. The program includes two case studies of mythical countries which are presumed to be engaged in specific types of statistical activities. New Florencia: A Case Study for the 1970 Censuses of Population and Housing covers all phases of a population and housing census--from determining the objectives and setting up table outlines to processing and analyzing the results. Atlantida: A Case Study in Household Sample Surveys covers all phases of a household sample survey programs. As part of this workshop, participants engage in a 1-week field exercise in which they list all the households in selected land segments, interview a sample of households selected from the listing, and conduct a re-interview to evaluate responses. A recommended curriculum is shown on the next page. Participants may want to substitute other courses for part of the list or choose some academic work, in accordance with their specific training objectives.

Candidate requirements

Participants should have had some working experience (at least a year) in population statistical programs and a basic knowledge of algebra. Formal educational background may range from high school graduation to advanced university degrees. Academic training in mathematics, statistics, sociology, and demography is especially helpful; a basic acquaintance with demographic measures and trends is also desirable but not required. (See page 2 for English language requirements.)

POPULATION

A. COURSES AND WORKSHOPS

		Class hours per week
First training period--September 15 to December 17, 1971		
101	Basic Statistical Concepts and Methods of Analysis	3.0
301	Population and Housing Census Methods	1.5
302	Laboratory Sessions on Life Table Construction	(Indefinite)
304	Introduction to Population Analysis	3.0
601	Geography and Mapping for Surveys and Censuses	3.0
602	Survey Questionnaires and Forms: Design	1.5
600	Seminar: Role of Statistics in Development	1 week**
Second training period--January 3 to March 15, 1972		
102	*Principles of Sample Surveys	3.0
303	World Population Trends and Problems	1.5
305	Advanced Techniques of Population Analysis	3.0
306	Population Projections	1.5
390	New Florencia: A Case Study for the 1970 Censuses of Population and Housing	4.5
603	Survey Questionnaires and Forms: Response Research	1.5
350-1	Special Projects in Population	(Indefinite)
Third training period--March 20 to May 26, 1972		
122	Introduction to the Control and Evaluation of Nonsampling Errors	3.0
307	Introduction to Mathematics of Demography	1.5
308	Demographic Measures from Incomplete Data	3.0
311	Population and Family Planning	1.5
501	Subject-matter Planning for Data Processing	3.0
604	Publication of Statistical Data	1.5
605	Analytical Approach to Training	1.5
350-2	Special Projects in Population	(Indefinite)
Fourth training period--June 5 to July 28, 1972		
190	Atlantida: A Case Study in Household Sample Surveys	8 weeks**
375	Seminar: Advanced Demographic Analysis (Spanish only)	6 weeks**

B. OTHER TRAINING

Selection also may be made from courses listed on pages 4 and 5 to supplement or replace part of the above.

*For participants with statistical background equivalent to course 101; offered also in the first training period.
**Full time.

SAMPLING

SAMPLING AND SURVEY METHODS

Training objectives

This program has been developed to permit adaptation to the needs of mathematical and survey statisticians in varied levels of responsibility. Expertise in designing large-scale sample surveys and estimating population values from sample data normally is developed over a long period of application and experience laid on a foundation of sound technical knowledge. An 11-month training program cannot produce sampling experts; however, it will enable participants to greatly improve their understanding of the principles of statistical inference as applied to the design and evaluation of surveys, and to study a variety of applications of those principles. The program will cover, for example, the principles of stratification, cluster sampling, ratio estimation, and techniques for optimizing sample designs. A variety of applications of these principles will be studied.

Participants will also learn, through intensive case studies of mythical countries, to plan, coordinate, and control all phases of censuses and sample surveys based on households, agricultural holdings, or economic establishments.

Duration

The entire program lasts 11 months and is divided into four training periods. Statisticians with a good background beyond the level of courses offered in the first training period can be scheduled for a program of 7 or 8 months, beginning in January 1972. It is expected that all persons who attend the classroom training normally will participate in one of the sample survey workshops. Separate enrollment for the workshops in the fourth training period is available for experienced statisticians who do not participate in the first three training periods.

Training plan

The first three training periods will include classroom work, seminars, laboratory sessions, and a report on some aspect of sampling and survey methods appropriate to the participant's own country. Courses in population and demography, agricultural statistics, economic statistics, and data processing are offered. The fourth training period permits a choice of either a household sample survey workshop or an agricultural sample survey workshop. The workshops cover all aspects of planning and implementing sample surveys, including experience in actual field listing and enumerating.

A recommended curriculum for participants specializing in sampling and survey methods appears on the next page. This curriculum assumes that participants specializing in Sampling and Survey Methods will not require Course 101, Basic Statistical Concepts and Methods of Analysis, although this course will be presented in the first training period and can be taken if needed. Statisticians who wish to include courses in other subject areas which are related to sampling and survey methods may select from those listed on pages 4 and 5. Participants with a more advanced level of statistical training or experience will receive some advanced training in design, analysis, and evaluation of sample surveys.

Candidate requirements

As a minimum, participants should have completed a secondary school course in algebra, and an elementary statistics course or its equivalent. Other academic training in statistics and mathematics will be helpful. Most participants in this field hold a university degree, although formal education may range from high school graduation to an advanced university degree. (See page 2 for English language requirements.)

SAMPLING

A. COURSES AND WORKSHOPS

		Class hours per week
First training period--September 15 to December 17, 1971		
102	*Principles of Sample Surveys	3.0
301	Population and Housing Census Methods	1.5
501	Subject-matter Planning for Data Processing	3.0
601	Geography and Mapping for Surveys and Censuses	3.0
602	Survey Questionnaires and Forms: Design	1.5
600	Seminar: Role of Statistics in Development	1 week **
Second training period--January 3 to March 15, 1972		
115	Advanced Sampling Seminar	3.0
150-1	Special Projects in Sampling and Survey Methods	(Indefinite)
603	Survey Questionnaires and Forms: Response Research	1.5
	Choice of the following and/or academic courses at a university	
202-1	Objective Measurement of Yield and Area	3.0
390	New Florencia: A Case Study for the 1970 Censuses of Population and Housing	4.5
403-1	Introduction to Mathematics for Economic Analysis	1.5
Third training period--March 20 to May 26, 1972		
103	Applications of Sample Design	1.5
122	Introduction to the Control and Evaluation of Nonsampling Errors	3.0
150-2	Special Projects in Sampling and Survey Methods	(Indefinite)
604	Publication of Statistical Data	1.5
605	Analytical Approach to Training	1.5
	Choice of the following and/or academic courses at a university	
202-2	Objective Measurement of Yield and Area	3.0
403-2	Introduction to Mathematics for Economic Analysis	1.5
Fourth training period--June 5 to July 28, 1972		
	Choice of the following and/or academic courses at a university	
190	Atlantida: A Case Study in Household Sample Surveys	8 weeks **
290	Agriculture Sample Survey Workshop and Field Demonstration	8 weeks **

B. OTHER TRAINING

Selection also may be made from courses listed on pages 4 and 5 to supplement or replace part of the above.

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*For participants with statistical background equivalent to course 101; offered also in the second training period.

** Full time.

AGRICULTURAL SURVEYS AND CENSUSES

(Based on Joint FAO/US Agricultural Statistics Training Program)

Training objectives

There is continuing need to obtain more precise and current information on the structure, distribution practices, production, and productive capacity of the agricultural sector in the developing nations. As a consequence, the U. S. Government agreed to join with the Food and Agriculture Organization of the United Nations (FAO) in a world-wide program to train statisticians of developing countries who would be responsible for planning and carrying out agricultural surveys and censuses.

To implement this important decision, the FAO and the U. S. Bureau of the Census, with collaboration by the U. S. Department of Agriculture, have carried out four rounds of a 1-year training program, starting in September 1967. The emphasis in these four rounds was placed on the planning and implementation of the 1970 World Census of Agriculture.

In the term 1971-1972, the training in agricultural surveys and censuses will be based on the Joint FAO/US Training Program but will have added emphasis on current agricultural statistics and their integration with censuses.

Duration

The entire program lasts 11 months. Participants may join the program at the beginning of the second training period if they have prior education or experience equivalent to the training offered during the first training period. It is expected that all persons who undergo the classroom training normally participate in the Agriculture Sample Survey Workshop and Field Demonstration in the fourth training period. Separate enrollment for the fourth training period is available for experienced statistical technicians who do not participate in the first three training periods.

Training plan

The 11-month program is divided into four training periods, as shown on the next page. The first three training periods consist of classroom instruction, seminars, laboratory sessions, and the preparation of country reports. The fourth training period concentrates on an Agriculture Sample Survey Workshop and Field Demonstration. The workshop covers all aspects of a statistical survey program--from determining the objectives to the analysis and publication of the data. The demonstration field survey involves the participant in an actual field exercise in an agricultural area. He takes part in selecting sample segments, listing the holdings, applying objective measurements, interviewing at sample holdings, and processing the results.

A recommended curriculum for agricultural statistics participants is shown on the next page. Statisticians who wish to specialize in fields related to their particular responsibilities or professional interests (sampling, data processing, economics, etc.) may select such courses from those described on pages 6 to 16.

Candidate requirements

Participants should have had some experience (at least a year) in agricultural statistical programs. Academic training in statistics, mathematics, and economics is very helpful. A university degree also is desirable, although formal education may range from high school graduation to an advanced university degree. (See page 2 for English language requirements.)

AGRICULTURE

A. COURSES AND WORKSHOPS

		Class hours per week
First training period--September 15 to December 17, 1971		
101	Basic Statistical Concepts and Methods of Analysis	3.0
102	*Principles of Sample Surveys	3.0
201-1	Current Agricultural Survey Methods	3.0
501	Subject-matter Planning for Data Processing	3.0
601	Geography and Mapping for Surveys and Censuses	3.0
602	Survey Questionnaires and Forms: Design	1.5
600	Seminar: Role of Statistics in Development	1 week **
Second training period--January 3 to March 15, 1972		
102	Principles of Sample Surveys	3.0
115	Advanced Sampling Seminar	3.0
201-2	Current Agricultural Survey Methods	3.0
202-1	Objective Measurement of Yield and Area	3.0
203	Demonstration Sample Survey Laboratory	3.0
250-1	Special Projects in Agricultural Statistics	(Indefinite)
603	Survey Questionnaires and Forms: Response Research	1.5
Third training period--March 20 to May 26, 1972		
103	Applications of Sample Design	1.5
122	Introduction to the Control and Evaluation of Nonsampling Errors	3.0
202-2	Objective Measurement of Yield and Area	3.0
250-2	Special Projects in Agricultural Statistics	(Indefinite)
604	Publication of Statistical Data	1.5
605	Analytical Approach to Training	1.5
Fourth training period: June 5 to July 28, 1972		
290	Agriculture Sample Survey Workshop and Field Demonstration	8 weeks**

B. OTHER TRAINING

Selection also may be made from courses listed on pages 4 and 5 to supplement or replace part of the above.

*For participants with statistical background equivalent to course 101; offered also in second training period.
** Full time.

ECONOMICS

ECONOMIC SURVEYS AND CENSUSES

Training objectives

The training program provides instruction in the statistical concepts and operations appropriate to the measurement and analysis of various branches of basic economic activity. Persons with responsibility for basic economic surveys and censuses are given opportunity to study applicable concepts and techniques and/or refine their knowledge in these fields. The objective is to prepare technicians to initiate or to improve national programs in industrial statistics, foreign trade statistics, and distributive and service trade statistics, depending on individual specialization.

Duration

The usual training program is of 11 months' duration, beginning in September 1971 and concluding in August 1972. Shorter programs may be recommended by the Bureau of the Census if country training objectives, participant's qualifications, and availability of training programs warrant shorter time.

Training plan

The entire program lasts 11 months and is divided into four training periods. A recommended curriculum appears on the next page.

The first training period covers a study of economic concepts and operations appropriate to any basic type of economic statistical inquiry. In the second training period, the principal element is the Providencia Case Study Workshop. This project involves the study of a mythical country which is planning to undertake a series of basic economic censuses. Participants will learn to plan, coordinate, and control all phases of an economic census or related sample survey. They will be encouraged to prepare a report on some aspect of economic statistics for their own countries, adapting the ideas they gain in the classroom training.

The third training period continues with basic economics and statistics but features specially arranged in-depth study of United States economic statistics programs. These programs vary in accordance with specific needs of participants, covering subject matter appropriate to economic measurement and analysis.

In the fourth training period, participants may enroll in a workshop which utilizes Atlantida: A Case Study in Household Sample Surveys. The workshop demonstrates how the Atlantida techniques may be employed to gather economic data at the household level.

Throughout the year, the classroom and workshop courses will be interspersed with appropriate seminars in national accounts, balance of payments, and labor/price statistics. The Census Bureau curriculum may be supplemented also by enrollment in appropriate evening classes at the Graduate School of the United States Department of Agriculture or a summer term at a Washington-area university.

Candidate requirements

The program is available to foreign statisticians and technicians who have had some working experience (at least a year) in national statistical programs. Formal educational background may range from high school graduation to advanced university degrees. Academic training in mathematics, statistics, and economics is especially desirable. (See page 2 for English language requirements.)

ECONOMICS

A. COURSES AND WORKSHOPS

		Class hours per week
First training period--September 15 to December 17, 1971		
101	Basic Statistical Concepts and Methods of Analysis	3.0
401	Basic Economic Statistical Concepts and Operations	3.0
402-1	Principles of Economics: An Introductory Analysis	1.5
601	Geography and Mapping for Surveys and Censuses	3.0
602	Survey Questionnaires and Forms: Design	1.5
600	Seminar: Role of Statistics in Development	1 week**
Second training period--January 3 to March 15, 1972		
102	*Principles of Sample Surveys	3.0
402-2	Principles of Economics: An Introductory Analysis	1.5
403-1	Introduction to Mathematics for Economic Analysis	1.5
450-1	Special Projects in Economic Statistics	(Indefinite)
490	Providencia: A Case Study in Economic Censuses	4.5
603	Survey Questionnaires and Forms: Response Research	1.5
Third training period--March 20 to May 26, 1972		
122	Introduction to the Control and Evaluation of Nonsampling Errors	3.0
403-2	Introduction to Mathematics for Economic Analysis	1.5
420	Study of Selected U.S. Economic Statistics Programs	3.0
450-2	Special Projects in Economic Statistics	(Indefinite)
501	Subject-matter Planning for Data Processing	3.0
604	Publication of Statistical Data	1.5
605	Analytical Approach to Training	1.5
Fourth training period--June 5 to July 28, 1972		
190	Atlantida: A Case Study in Household Sample Surveys	8 weeks**
	or	
	Academic courses related to training objectives	

B. OTHER TRAINING

Selection also may be made from courses listed on pages 4 and 5 to supplement or replace part of the above. Seminars in related topics also can be arranged (see opposite page).

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*For participants with statistical background equivalent to course 101; offered also in first training period.

**Full time.

DATA PROCESSING

Training objectives

This training is designed to provide the knowledge and skills needed to qualify persons as computer programmers, project planners, ADP (Automatic Data Processing) operations managers, and systems analysts in data processing installations and to upgrade the technical capabilities of persons already employed in these occupations. Although primarily designed for persons in government statistical offices, the program is flexible and adaptable to requirements of technicians in government banking systems or general-purpose computer centers.

Duration

The training program may last from 3 to 11 months, depending on the type and amount of training required. A minimum period of 6 months is recommended for all except advanced personnel with very specific training objectives. Duration of specific courses is indicated in the course list on the next two pages.

Training plan

Courses in the data processing curriculum are grouped by three levels--basic, intermediate, and advanced, which also correspond to the order of presentation throughout the training year. Basic training begins in September; courses for experienced programmers and systems analysts are offered primarily in the period January to May, corresponding to the second and third training periods.

In contrast to training in the other specialized areas, most of the data processing courses are offered on a full-time basis and are of short duration. Most of the courses are given at the Bureau of the Census; however, use is made of other training facilities considered appropriate for individual participants. These include education centers operated by equipment manufacturers, universities, and data processing installations of public and private agencies. Courses listed in the curriculum are available at the Bureau of the Census unless otherwise indicated in parentheses preceding the course number; for example, (IBM) 523 is a course given at an IBM installation in the Washington area.

Since data processing participants will be working with specific equipment installations in their home countries, much of the training is related to specific models of computers and auxiliary equipment of the types currently being used or planned to be purchased by the organizations in which the participants are employed.

Forms of instruction include classroom courses, self-study with programmed instruction texts and supervisory consultation, and individual projects applicable to the participants' own countries. Program planning, flowcharting and coding are regular components of computer language classes, and programs are tested on Bureau equipment. Assistance is provided in analysis, test-deck preparation and "debugging" of programs.

Candidate requirements

Although a secondary level of education and some working experience in data processing is highly desirable, there are no specific prerequisites for the basic courses in data processing. Participants may join the program at the beginning of the second or third training period if they have prior education or experience equivalent to the training offered during the prior training period(s). (See page 2 for English language requirements.)

DATA PROCESSING

A. CORE COURSES

(The letters IBM and CSC preceding course numbers designate IBM Education Center and the U. S. Civil Service Commission, respectively; all other courses are given at the Bureau of the Census. Except for 501 and 590, the courses are full-time for short periods.)

		Length of course
First training period--September 15 to December 17, 1971		
	Basic level	
501	Subject-matter Planning for Data Processing	3 hours per week
511	Computing Systems Fundamentals	3 weeks
512	Fundamentals of Programming	1 week
513	COBOL Programming and Testing	4 weeks
514	*IBM S/360 Introduction	3 weeks
515	*RPG Coding for Computers	1 week
Second training period--January 3 to March 15, 1972		
	Intermediate level	
514	*IBM S/360 Introduction	3 weeks
515	*RPG Coding for Computers	1 week
521	IBM S/360 Assembler Language Coding	4 weeks
522	Job Control Card and Utility Programs	1 week
(IBM) 523	*Disk/Tape Operating Systems	1 week
(CSC) 524	Systems Analysis - Project Planning	1 week
590-1	CENTS: Census Tabulation System	4 ½ hours per week
Third training period--March 20 to May 26, 1972		
	Advanced level	
(IBM) 523	*Disk/Tape Operating Systems	1 week
(IBM) 531	Disk/Tape Data Management Coding	1 week
532	FORTRAN IV Coding	4 weeks
533	PL/1 Coding	4 weeks
(CSC) 534	Systems Analysis Workshop	3 weeks
590-2	CENTS: Census Tabulation System	4 ½ hours per week
Fourth training period--June 5 to July 28		
550	Special Projects in Systems Planning	(Indefinite)

*Same course offered in two training periods.

DATA PROCESSING

B. ILLUSTRATIVE LIST OF SUPPLEMENTARY COURSES

(Data processing participants normally take core courses on page 15, as appropriate. In addition, a wide range of courses and seminars is available in the Washington area; some require full-time study for short periods and others meet 3 or 4 hours each week for an academic semester.)

At the U.S. Civil Service Commission (usually several times a year)	Length of course
Management Introduction to ADP	3 days
ADP in Technical Information Systems	1 week
Principles of Auditing in ADP Environment	3 weeks
ADP in Financial Management	1 week
Indexing and Abstracting for ADP Information Systems	1 week
Advanced Computer Systems Technology	1 week
Executive Workshop in Systems Analysis	1 week
Executive Seminar in ADP	3 days
ADP Management and Administration	3 days

At UNIVAC Education Center (schedule varies)	
Assembler Language Coding (ALC) UNIVAC 9200 and 9300	2 weeks
Disk/Tape Operating System for UNIVAC 9300	2 weeks
UNIVAC 9400 ALC and Operating System	3 weeks
FORTRAN V for UNIVAC 1106/1108	2 weeks

At IBM Education Center (schedule varies)	
Introduction to System/370	2 days
Software Application Seminars	3 to 5 days
S/360 Model 20 Installation Programming (RPG)	2 weeks
S/360 Model 20 ALC Workshop	1 week
Introduction to Data Communications	2 days

At Graduate School, U.S. Department of Agriculture (Saturday mornings or weekday evenings--usually twice a year)	
Advanced COBOL Techniques (Practice)	1 semester
FORTRAN IV (with or without practice)	1 semester
Teleprocessing and Data Communications Systems	1 semester
Real Time Computer Systems	1 semester
Introduction to UNIVAC 1108	1 semester

DESCRIPTION OF COURSES

The description below outlines the scope and content of each course, the training period in which it is offered, and the number of class sessions that are held. If the course covers more than one training period, the number of class sessions is the total for the entire course.

101 Basic Statistical Concepts and Methods of Analysis (First--24 sessions)

This course starts with a brief review of mathematical principles and notation essential to elementary statistics. It covers tabular and graphic methods of presenting statistical data, definitions and computational methods for measures of central tendency and dispersion, the normal curve and its uses, correlation, regression, and index numbers. Finally, there is an intuitive explanation of the principles of statistical inference as applied to the estimation of means and aggregates from sample surveys.

102 Principles of Sample Surveys (First or second--20 sessions)

This course presents the basic principles of sampling as applied to surveys. It covers simple random sampling, systematic sampling, stratification, cluster sampling, ratio estimates, and consideration of practical problems arising in choice of sampling frames and the selection of the sample. Special topics include area sampling, multi-stage sampling, selection with probability proportional to size, and optimum allocation with respect to variance and costs.

103 Applications of Sample Design (Third--10 sessions)

Various sample designs and their application to specific surveys will be considered. The aim of the course is to illustrate how to apply principles of sampling to surveys of population, labor force, consumer expenditure, housing, and similar topics; to develop alternative sample designs for such surveys; and to relate these sample designs to those used in developing countries.

115 Advanced Sampling Seminar (Second--20 sessions)

Advanced sampling methods which can be applied in censuses and surveys are studied. Selected topics in sample selection, estimation procedures, and computation of sampling errors are included. This course is limited to persons who qualify for advanced work in statistics and sampling. Pre-requisite: Course 102 or equivalent.

122 Introduction to the Control and Evaluation of Nonsampling Errors (Third--20 sessions)

This course is planned in the context of "total error" in sample surveys and censuses, which represents the degree to which the data fail to accurately represent the characteristic or value being measured. When sampling is involved in the investigation, both sampling and nonsampling errors contribute to total error. Nonsampling errors are treated from two viewpoints: methods for their control and reduction in the preparatory, data-collection, and processing stages of a survey (or census); and methods for evaluating the effects of the remaining errors in the final results of the survey. Where possible, the analysis is related to a theoretical model which permits scientific inferences to be made. Case studies in such fields as household and agricultural surveys and in population, housing, and agriculture censuses are used to illustrate control techniques and to describe survey designs which facilitate the measurement and analysis of nonsampling errors.

150 Special Projects in Sampling and Survey Methods (Second and third--Indefinite)

The participant, working under the guidance of the staff sampling adviser, will develop specific sample designs pertaining to his particular subject-matter area and his country, using his country experience and skills acquired from previous sampling and other statistical courses. It is expected that these sample designs will be capable of being incorporated into a statistical survey program in the participant's country.

190 Atlantida: A Case Study in Household Sample Surveys (Fourth--8 weeks full time)

This case study emphasizes techniques of organizing and conducting household sample surveys. Case study instructional materials for the mythical country of Atlantida illustrate different kinds of skills and procedures required to provide current data on such subjects as population change, health, education, food consumption and nutrition, housing, manpower, and economic levels of living. The materials consist of the following units: (a) objectives of a survey, (b) content and design, (c) population data controls, (d) sample design, (e) field operations, (f) distribution and receipt of survey materials, (g) editing and coding, (h) tabulation processes, and (i) review and analysis of data. The case study is offered on a full-time basis in the fourth training period.

201 Current Agricultural Survey Methods (First and second--44 sessions)

Concepts set forth by the FAO for the 1970 World Census of Agriculture and the linkage of census and current agricultural statistics are studied. Techniques of compiling agricultural statistics by means of current surveys are studied, particularly as they apply to developing countries. The applications of principles of sampling in preparing agricultural estimates are presented, and the types of information needed for making forecasts are described.

Discussion covers methods of planning, administering, and managing a program of agricultural statistics. Some of the subjects covered include budgeting for a survey or census; setting up and administering a census or survey organization; handling of employee relations; uses of quality control checks; uses of check data; relations with data users; and communication with government administrators.

Types of sampling frames are studied with emphasis on probability area- and list-sampling. Crop and livestock surveys are discussed for the purpose of demonstrating statistical methodology applied in the formulation of statistics for field crops, vegetables, fruits, nuts, livestock and poultry.

Other areas of investigation, such as surveys on credit, fertilizer use, etc., will be discussed in accordance with the needs of the participants.

202 Objective Measurement of Yield and Area (Second and third--40 sessions)

The course will cover methods of objectively measuring area and yield for (a) cereal crops such as wheat and rice, (b) row crops such as maize and cotton, and (c) tree fruit and nut crops such as apples, citrus fruits, and filberts. Crop-cutting survey procedures will be described. Subjects covered include the development of estimating models, sample design and selection, field procedures, and processing the survey results. Examples of procedures used in developing countries will be discussed during the course. Actual field procedure demonstrations will be incorporated in Course 290.

203 Demonstration Sample Survey Laboratory (Second--20 sessions)

Participants will jointly prepare the technical materials and procedures to be used in the Field Demonstration (Course 290). These include the survey questionnaire and forms, instructional manual, table outlines, and the sample design for selecting enumeration units. The technical knowledge needed to perform these duties is developed in the courses studied earlier.

250 Special Projects in Agricultural Statistics (Second and third--Indefinite)

The participants first will study reports prepared by FAO and AID advisers who have assisted a country in an agricultural census or survey program. Such reports offer practical solutions to real situations.

Each participant then will prepare a comprehensive outline of a national program of agricultural statistics for his country. The outline will include a description of the types and quality of agricultural statistics in his country, and the national conditions and considerations which have a bearing on its program of agricultural statistics. Other elements of this outline will include legislation, organization, scope and coverage of the census or survey, proposed budget, general description of sampling frames, plan for field collection, and plan for data processing and analysis. Later in the course, the participant will develop in detail one aspect of his proposed current survey program. Participants from the same country may work together to develop a national program and survey plan.

290 Agriculture Sample Survey Workshop and Field Demonstration (Fourth -- 8 weeks full time)

The workshop will involve the participants in the study of concepts, procedures, and materials from actual surveys conducted in selected developing countries, and other materials developed for use in the case study. Case studies will include surveys in current agricultural statistics and objective measurements of area and yield. During the workshop, participants will review these materials and attempt to relate them to current agricultural survey or census problems in their own countries.

Part of the workshop period will be spent in studying materials developed for the Agrostan Case Study. Agrostan is a mythical country presumed to be in the process of planning and implementing a sample census of agriculture. All aspects of a census program are illustrated--from determining the objectives and selecting the sample to tabulating and analyzing the results. The workshop will present portions of the Agrostan Case Study which are relevant to current survey programs.

The field demonstration will involve the participants in conducting an actual agricultural sample survey in a rural farming area for the purpose of putting into practice their earlier classroom training. Materials and procedures developed during the Demonstration Sample Survey Laboratory such as survey questionnaires and forms, instruction material, selection of sample enumeration areas, and table formats, are utilized during the field demonstration.

Participants will carry out the principal activites involved in conducting an agricultural survey: (a) prepare a sampling frame by listing the holdings in the sample enumeration areas; (b) select a sample of holdings; (c) enumerate the sample holdings; (d) edit, code, and tabulate the survey data; and (e) analyze the tabulations.

A supporting activity of the sample survey will be an exercise in objective measurements. Participants will select the sample fields; lay out plots; measure and harvest the plots; and thresh, clean, and weigh the crop cuttings.

301 Population and Housing Census Methods (First--12 sessions)

This course is a study of the different aspects of planning and conducting population and housing censuses, with emphasis on adapting census programs to national needs and conditions within a framework of international standards for subject coverage and comparability of data. Specific topics include UN recommendations for the 1970 World Population and Housing Censuses, the different stages of a census program, and national census experience and prospects for countries represented in the training group.

302 Laboratory Sessions on Life Table Construction (First--Indefinite)

Knowledge of the life table is essential for understanding many useful techniques of population analysis. This course emphasizes both the theoretical aspects of the life table and the practical aspects of life table construction. In a supervised statistical laboratory, the opportunity is provided to calculate all the functions of an abridged life table from basic demographic data.

303 World Population Trends and Problems (Second--10 sessions)

This course outlines the present state of knowledge and hypotheses concerning the factors which affect population trends and the influence which these factors have upon economic and social conditions. The historical patterns of population growth are traced through their causes and consequences, with particular emphasis given to the interrelationships between population growth and economic development.

304 Introduction to Population Analysis (First--24 sessions)

Basic methods of population data analysis provide the fundamental methodology applicable to population data of varying quality and content. The course includes study of the principles of demography and the statistical measurement of population composition, fertility, mortality, and migration.

305 Advanced Techniques of Population Analysis (Second--20 sessions)

Adjustments for errors of age in census and registration statistics are studied as are the more refined measures of mortality, fertility, and migration. The construction of mortality tables and abridged life tables is reviewed in the course.

306 Population Projections (Second--10 sessions)

This course includes presentation and analysis of demographic techniques used for estimating and projecting populations. Methods to be covered include inter-censal and post-censal estimates and mathematical methods of projections. The component method of projection is given special attention.

307 Introduction to Mathematics of Demography (Third--10 sessions)

This course is offered to participants with sufficient mathematical background. It deals with mathematical tools and their use in demography. Topics covered include: graphic, polynomial, and osculatory interpolation; the method of least squares; adjustment to marginal totals; mathematical models of response error; matrix methods in demography; and the stationary population model.

308. Demographic Measures from Incomplete Data (Third--20 sessions)

Particpants study and practice the methods of estimating fertility and mortality measures and population growth for areas which do not possess all the types of data normally used in their derivation. Practice is given in the selection and use of regional model life tables and stable populations.

311 Population and Family Planning (Third--10 sessions)

This course is intended to provide a basic knowledge of family planning to statisticians and demographers and to facilitate their cooperation with action programs in population dynamics. It reviews the history and present trends in family planning and population control. Emphasis is given to methods of collecting and analyzing statistics needed for planning, administering, and evaluating family planning programs.

350. Special Projects in Population (Second and third--Indefinite)

Each participant, working individually or together with other participants from the same country, will develop a specific own-country oriented population project. The program plan should reflect not only the participant's own home-country experience, but also the skills acquired from previous statistical and population courses. Under the guidance of a staff member, a plan will be fully developed and documented, which then can be implemented and administered by the participant upon return to his own country.

375 Seminar: Advanced Demographic Analysis (Spanish only) (Fourth--6 weeks full time)

In this seminar technical specialists from Latin American countries will be introduced to the more advanced methodology of demographic analysis. Special topics will be introduced according to particular needs. Known analytical methods will be discussed and new methods will be introduced to increase technical knowledge and allow for discriminating selection of methods for specific situations. Specific seminar content will be influenced by areas of participant interest but include such topics as adjusting deficient data, estimation and projection of population, selection and use of stable population models, and migration analysis.

390 New Florencia: A Case Study for the 1970 Censuses of Population and Housing (Second--30 sessions)

This case study will utilize a comprehensive census model for the mythical country of New Florencia to provide census technicians with knowledge and skills needed to improve the timeliness, reliability, and adequacy of population and housing censuses in developing countries. The model will use as basic input and output the UN recommendations for the 1970 World Census of Population on data to be collected and the tabular formats for their presentation.

The material for the case study is grouped into eight units: (a) action-oriented census program, (b) administrative requirements and mapping, (c) data-collection operations, (d) sampling, (e) data processing, (f) quality control, (g) census evaluation survey, and (h) review, analysis, and publication of data.

401 Basic Economic Statistical Concepts and Operations (First--24 sessions)

This program includes a study of economic census and survey concepts--types of data to be sought, classification technology, and methodology involved in the collection, processing, and publication of data.

Participants will be introduced to the methods used in planning and conducting economic censuses and surveys. Emphasis is placed on the initial planning of the economic inquiry

using international standards. During the course, each participant is expected to complete certain assignments on the subject matter as presented.

402 Principles of Economics: An Introductory Analysis (First and second--22 sessions)

The course is designed to familiarize the student with basic tools of economic analysis and their application to questions of economic policy. The course will be given in two sections. The first training period will cover resources, production, and capital formation; business organization and finance; money and the banking system; volume of economic activity and control of fluctuations. The second training period will deal with functioning of price system; distribution of national income; international economics; economic growth.

403. Introduction to Mathematics for Economic Analysis (Second and third--20 sessions)

This course is designed to review with participants elementary algebraic principles and their economic applications, including application to the economic phenomenon of equilibrium. In addition, elements of differential and integral calculus are presented along with their economic applications. The theory of economic growth and planning is introduced through simple arithmetic and geometric theory. Finally, the course develops certain extensions of elementary mathematics such as permutations and combinations, matrices, and difference equations for use in economic analysis. The course is given over the second and third training periods. Pre-requisite: A basic knowledge of algebra.

420 Study of Selected U. S. Economic Statistics Programs (Third--Indefinite)

Selective programming is arranged for participants to study specific economic statistics programs related to their training objectives and subject-area responsibilities in their home countries. Within the Bureau of the Census, subject-matter specialists will present the methods used in collecting data through various economic censuses and related surveys. Programs normally will be developed for individuals and small groups of participants along lines of subject-matter specialization corresponding to the organization of the economic fields of the Bureau of the Census. Through acquaintance with the U. S. materials and consultation with the Census Bureau specialists, participants may study concepts, methodology and procedures in their areas of specialization with a view to obtaining new insights and tools to be applied to similar programs in their own countries.

450. Special Projects in Economic Statistics (Second and third--Indefinite)

In this course the participant will develop a specific economics project related to his responsiblities in his home agency. Using his own experience and acquired skills from previous statistical and economics courses, the participant will work under the guidance of a staff member to develop documentation of plans for the implementation and administration of an economic statistics program, upon return to his own country.

490 Providencia: A Case Study in Economic Censuses (Second--30 sessions)

This case study on economic census planning is concerned with how to develop a set of census concepts and definitions; how to establish a list of businesses, how to set up a sampling plan; how to enumerate the selected statistical unit; how to control the distribution, receipt and editing of questionnaires; how to program the sorting and tabulating of results including the estimating of workload requirements; and how to review data tables before making publication plans and before actual publication of results.

501 to 590 Training in Automatic Data Processing (ADP) is organized in three levels--basic, intermediate, and advanced. Each level includes core courses and supplementary training with variations in program selections for individuals and groups. In general, the title wording provides adequate information on the course content. In this section, therefore, individual course descriptions are replaced by collective descriptions for the three levels of training, except for Courses 501 and 590 for which individual course descriptions are furnished.

501 Subject-matter Planning for Data Processing (First or third--20 sessions)

This course introduces subject-matter specialists to the basic principles and concepts of data processing, including an understanding and appreciation of computers and automation as tools for aiding the utilization of data collected in censuses and surveys. Emphasis is given to project planning and flowcharting and to preparing tabulation specifications for use by ADP specialists. Attention also will be focused on alternatives to using the computer for processing data for small projects.

590 CENTS: Census Tabulation System (Second and third--60 sessions)

This course is designed to accelerate census processing and reduce the time required to write computer programs and tabulate a census by as much as 50 percent over the usual methods. Participants will be instructed in the CENTS computer tabulation technique, provided with tested computer programs, and instructed in adapting the programs for their own censuses. Although designed primarily for the population and housing censuses, the system is applicable to agriculture censuses, household sample surveys, and many other statistical programs.

The first half of the two-part course (590-1) will provide an overview of census electronic data processing and instruction in the use of parameter cards needed to prepare tabulations. The second half (590-2) will offer detailed instructions in CENTS software, with emphasis on the special programming techniques that are used.

511 to 515 Basic level

The basic courses in ADP are designed to train prospective programmers for handling typical data processing problems before they start work in a computer data processing installation. Problem analysis, flowcharting, decision tables, and test deck preparation are included in the fundamental courses. Instruction in COBOL coding language will introduce participants to program preparation for computers. The S/360 Introduction will not be mandatory for those not using IBM computers; however, it provides an excellent introduction to those functional characteristics, channels, central processing units, and input/output devices of computer systems in general. Courses offered at the basic level are:

511 Computing Systems Fundamentals (First--3 weeks full time)

512 Fundamentals of Programming (First--1 week full time)

513 COBOL Programming and Testing (First--4 weeks full time)

514 IBM S/360 Introduction (First--3 weeks full time)

515 RPG Coding for Computers (First--1 week full time)

514 to 524 Intermediate level

The intermediate level of training is directed toward assisting the programmer-participant in gaining proficiency in the use of the Assembler Language and various operating systems. Additionally, training in project planning and in management

is developed through courses in systems analysis and courses in ADP management. Courses offered at the intermediate level are:

514 IBM S/360 Introduction (Second--3 weeks full time)

515 RPG Coding for Computers (Second--1 week full time)

521 IBM S/360 Assembler Language Coding (Second--4 weeks full time)

522 Job Control Card and Utility Programs (Second--1 week full time)

523(IBM) Disk/Tape Operating Systems (Second--1 week full time)

524(CSC) Systems Analysis - Project Planning (Second--1 week full time)

523 to 534 Advanced level

The courses offered at the advanced level are a continuation or extension of intermediate-level courses. Systems analysis and ADP management are stressed. Also, FORTRAN IV and PL/1 are offered for those interested in programming for scientific applications. Courses offered at the advanced level are:

523(IBM) Disk/Tape Operating Systems (Third--1 week full time)

531(IBM) Disk/Tape Data Management Coding (Third--1 week full time)

532 FORTRAN IV Coding (Third--4 weeks full time)

533 PL/1 Coding (Third--4 weeks full time)

534(CSC) Systems Analysis Workshop (Third--3 weeks full time)

Supplementary courses

In addition to the courses described above, a wide range of special-interest courses and seminars is available. Some require full-time study for short periods and others meet several hours a week for an academic semester. An illustrative list of supplementary courses is found on page 16.

550 Special Projects in Systems Planning (Fourth--Indefinite)

This special project activity should follow course 524, and preferably 534 also. An individual participant or small group of participants will develop a specific tabulation procedure or plan designed for application in one or more home countries and for specific types of electronic data processing equipment. ISP case study workshop materials (Atlantida, Agrostan, Providencia) may provide the basis for projects concerned with the normal range of censuses and surveys.

600 Seminar: Role of Statistics in Development (First--1 week full time)

This will be a special seminar with lectures, discussions and panel presentations. Its focus will be the critical role of statistics in providing the information necessary for development planning and measurement of progress toward national economic and social goals. The seminar will provide an introduction to the principles and concepts of development economics and national accounts. It also will deal with the types of statistical data most needed in the development process and the methodology of obtaining such data. Organizational patterns will be considered in terms of their effect on the generation and use of statistical data, with international agencies considered in combination with national ministries and their dependencies. Seminar speakers and discussants will include invited specialists from national and international organizations.

601 Geography and Mapping for Surveys and Censuses (First--24 sessions)

A study is made of the geographic aspects of survey and census work, especially practical methodology in the use of maps in preparing for and carrying out surveys and censuses. The course points out the importance of record-keeping when compiling maps for delimiting the work areas from which statistical information is to be collected. The use of maps for area sampling is covered. Field survey methods and the techniques of map drafting and reproduction are outlined and explained. Graphic presentation is presented through practical exercises in plotting and preparing statistical maps and charts. Alternative procedures to be used when adequate maps are not available also are studied.

602 Survey Questionnaires and Forms: Design (First--12 sessions)

This course covers principles and techniques used in the development of questionnaires and forms for surveys and censuses. Lectures cover the mechanics of the construction and design of the questionnaires and forms and the effective use of various type styles and spacing. Participants develop questionnaires and other forms for discussion and analysis.

603 Survey Questionnaires and Forms: Response Research (Second--10 sessions)

Problems of translating subject-matter concepts into questions designed to elicit accurate response will be discussed. Consideration will be given to response problems relating to enumerative, mail, and telephone surveys and related follow-up questions. The course will cover aspects of questionnaire design relating to attitudinal versus objective questions, the order in which questions are asked, the effect of certain questions (such as religion, race, income, marital status) on the respondent, and standardization of questions in enumerative surveys. Participants will develop alternative questions for several subject-matter surveys and pretest the questions to determine various types of response problems which might arise.

604 Publication of Statistical Data (Third--10 sessions excluding laboratory)

The theory and practice of tabular presentation involved in preparing tables and publishing the results of censuses and current surveys are studied. The course includes discussions on the scope, content, and planning of reports and news releases; allocations of adequate time and funds; approvals and clearances; design and layout of statistical tables; methods of reproduction; and distribution of publications to users and potential users.

605 Analytical Approach to Training (Third--10 sessions)

This course will first examine theories of learning. It will then apply these theories to different environments to determine the influence of culture and background on the learning process. Performance requirements in statistical programs will be analyzed using background readings and examples drawn from the work experience of the participants. Emphasis will be placed on developing techniques for applying statistical and analytical skills to such requirements. These insights and techniques should assist participants in applying the "multiplier effect" by conducting statistical training programs in their own countries on a national or regional level.

650 Special Projects in Statistical Technology (Second and third--Indefinite)

With staff guidance, the participant will develop a specific project related to a statistical program in his home country. He will use his experience and acquired skills in the area of statistical technology primarily, and other areas secondarily, to develop program plans for such specialties as mapping, publication of statistical data, field enumeration operations, and staffing.